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Public Interest Comment on *Mobile Wireless Competition Notice of Inquiry*¹ September 30, 2009

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The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. As part of its mission, RSP conducts careful and independent analyses employing contemporary economic scholarship to assess rulemaking proposals from the perspective of the public interest. Thus, this comment on the Federal Communications Commission's (FCC's) Notice of Inquiry does not represent the views of any particular affected party or special interest group, but is designed to assist the commission as it revises its framework for assessing competition in mobile wireless.

I. Introduction

Congress requires the FCC to submit annual reports on the state of competition in commercial mobile wireless communications.² On May 14, 2009, the FCC's Wireless Communications Bureau issued a public notice seeking data for its 14th annual report.³ On August 27, 2009, the commission adopted an additional Notice of Inquiry seeking comment on how it should "expand and enhance" its analysis of competition, "both to improve our assessment of the current state of competition in the entire mobile wireless market ecosystem and to better understand the net effects on the American consumer."⁴

Because the Notice of Inquiry considers broadening the scope of the commission's competitive analysis, the commission explicitly invited participation from additional parties who may not have participated in prior wireless competition proceedings,

¹ Prepared by Jerry Brito and Jerry Ellig, senior research fellows, Mercatus Center at George Mason University. This comment is one in a series of Public Interest Comments from Mercatus Center's Regulatory Studies Program and does not represent an official position of George Mason University.

² Federal Communications Commission, *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, WT Docket No. 08-27, *Thirteenth Report* (released January 16, 2009) [hereinafter "*Thirteenth Report*"]

³ FCC Public Notice, *Wireless Communications Bureau Seeks Comment on Commercial Mobile Radio Services Market Competition*, WT Docket 09-66 (released May 14, 2009) [hereinafter "FCC Public Notice"]

⁴ Federal Communications Commission, *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, WT Docket No. 09-66, *Notice of Inquiry* (released August 27, 2009) at para. 1. [hereinafter "*Wireless Competition Notice of Inquiry*"]

including academics.⁵ This comment responds to that invitation. We offer the following suggestions on six topics the commission explicitly sought comment upon:

- **Overall analytical framework:** The FCC's current framework investigates the mobile wireless industry's structure, firm conduct, consumer behavior, and market performance. This framework is adequate for understanding performance of the wireless carriers and the larger industry (including handsets, applications, etc.). However, the framework is only useful as a list of topics to consider. The commission should avoid assuming that market structure (such as the number of firms) rigidly determines firm conduct and market performance.
- **Non-regulatory entry barriers:** The commission's annual report on mobile wireless competition should include a rigorous definition of non-regulatory barriers to entry, a coherent theory explaining why enumerated potential barriers might satisfy that definition, and empirical analysis that shows whether the potential non-regulatory barriers are in fact barriers. The most recent report, for example, helpfully identifies advertising expenditures as a potential "sunk cost" that inhibits entry, but fails to explain whether the commission believes sunk costs are the *only* non-regulatory barriers to entry and provides no evidence assessing *how much* of the advertising expenditures are a sunk cost.
- **Spectrum as an entry barrier:** Analysis of spectrum as an entry barrier should recognize that limits on the amount of spectrum available for commercial use effectively limit the quantity and quality of service that existing or new carriers can offer. The fact that carriers willingly pay billions of dollars for spectrum indicates that federal spectrum policy limits entry and/or expansion of service. By limiting the quantity and quality of service, federal spectrum policy diminishes consumer welfare.
- **Switching costs:** Switching costs can inhibit competition, and the Notice of Inquiry asks for data about the size of switching costs. One can also examine consumer behavior to determine whether switching costs may be high or low. Substantial consumer "churn," totaling 18–36 percent per year, suggests that switching costs are relatively small compared to the benefits consumers perceive from switching. Therefore, it is unlikely that switching costs inhibit competition.
- **Profitability calculations:** Calculating wireless companies' profits based on accounting data would likely produce little additional insight about market performance and may produce highly misleading results. Past wireless competition reports demonstrate that the wireless market is structurally competitive, firms engage in rivalrous competition, prices have plummeted, and quantity and variety of services have expanded. We estimate that even a very stringent, efficient, and perfectly functioning regulatory system would have produced less than half of the price reductions that the competitive wireless

⁵ *Id.*, para. 6.

market produced during the past decade. Other, less ambiguous indicators—such as rivalrous firm conduct, substantial customer switching, and actual entry—demonstrate that mobile wireless is highly competitive.

- **Vertical relationships:** The commission asks how upstream and downstream relationships affect competition in wireless, and vice versa. A special concern in both this Notice of Inquiry and the accompanying one on wireless innovation is the existence of closed, proprietary platforms, and devices. A closed platform or device causes competitive concerns only if consumers lack access to competing platforms or devices. Given the intense competition between platforms with varying degrees of openness, we see little reason regulators should favor open over closed platforms.

II. The Overall Framework

The FCC’s mobile wireless competition reports have traditionally examined four factors: (1) industry structure (number of competitors, market shares, and barriers to entry), (2) firm conduct, (3) consumer behavior, and (4) market performance. The commission’s most fundamental questions ask whether this framework should change:

*Is our traditional four-pronged analytic framework sufficient to describe the full competitive dynamics and effects of the mobile wireless market, or are there other economic frameworks that would provide better analytical tools for analyzing the mobile wireless market? What new frameworks, models, standards, and metrics should the Commission consider in the Mobile Wireless Competition Report?*⁶

The commission’s traditional four-part framework is still adequate for assessing mobile wireless competition, *provided that* the commission continues to regard the four parts as a list of factors to consider rather than a causal theory of the relationship between market structure, conduct, and performance.

The FCC’s most-recent wireless competition report avoids a mechanistic application of the “structure-conduct-performance” framework, emphasizing that market structure does not necessarily determine conduct or performance:

As stated in earlier reports, the framework proceeds from the premise that indicators of market structure such as the number of competitors and their market shares are not, by themselves, a sufficient basis for determining whether there is effective competition, and whether any of the competitors have a dominant share of the market for commercial mobile services. Rather, we make these determinations based on an analysis of both the structural and the behavioral characteristics of the CMRS marketplace.⁷

⁶ *Wireless Competition Notice of Inquiry*, para. 9.

⁷ *Thirteenth Report*, para. 5.

Market concentration is necessary, but not sufficient, for unilateral or coordinated anticompetitive behavior to occur.⁸

This approach is consistent with contemporary economic research. Empirical and experimental research demonstrates that there is no automatic relationship between industry structure and market performance. Recent studies on the relationship between concentration and prices have produced a wide variety of results that depend on the facts and circumstances in the industry studied. Across a variety of industries, a number of studies find a positive relationship between concentration and prices, but not all do.⁹ Laboratory experiments find that four sellers are usually enough to produce a competitive market outcome. One senior Federal Trade Commission economist notes, “Perhaps most important for day-to-day antitrust work is the fairly common finding that across a wide range of market settings, four sellers and four buyers are enough to reach competitive outcomes even in experiments that do not allow new entry.”¹⁰ Experimental economists modeling gas pipeline networks with small numbers of competitors concluded, “[W]e find nothing inherently monopolistic about pipelines except in those parts of the networks served by only one pipeline. Even in these cases bargaining appears to be sufficiently symmetric to yield outcomes that do not disadvantage buyers.”¹¹ Some empirical research on railroads finds that two competitors are sufficient to produce the results one would expect in a competitive market—even though railroads arguably benefit from significant barriers to entry.¹² In general, the results seem to vary across industries and with the type of information buyers and sellers have. One leading textbook on antitrust and regulation notes,

During the 1950s and 1960s, empirical work based on [the structure-conduct-performance] framework sought to identify general relationships that would hold for all industries, such as a general coefficient that would indicate how adding one more firm would affect price. Time has shown that such a research program was misguided. Industrial organization economists now recognize that each industry is too idiosyncratic for us to think there is such a general stable relationship that would be applicable to many industries . . . Although the [structure-conduct-performance paradigm] is no longer the foundation for theory and empirical work in industrial organization, the categories of structure, conduct, and performance remain useful in organizing knowledge about an industry.¹³

In antitrust practice, the DOJ/FTC Merger Guidelines reflect the fact that there is no simple or mechanical relationship between the number of competitors and the

⁸ *Id.*, para. 63.

⁹ Paul A. Pautler, *Evidence on Mergers and Acquisitions*, 48 ANTITRUST BULL. 189-95 (2003).

¹⁰ *Id.* at 200-01.

¹¹ Kevin A. McCabe, Stephen J. Rassenti, and Vernon L. Smith, *Designing ‘Smart’ Computer-Assisted Markets*, J. POLIT. ECON. 259 (1989) at 283.

¹² *Id.* at 181-82, and references cited therein.

¹³ W. Kip Viscusi, Joseph E. Harrington, Jr., and John M. Vernon, *ECONOMICS OF REGULATION AND ANTITRUST* 62 (4th ed., 2005).

competitiveness of the market. The guidelines indicate that mergers in more concentrated markets face a heightened level of review, but such mergers can still be legal.¹⁴ The antitrust agencies try to take into account all relevant facts and circumstances in determining whether a merger would reduce competition and harm consumers. Measures of market concentration are useful primarily as a screen. If a market is structurally competitive, there is little reason to investigate further in search of market power.

The possibility of innovative or dynamic competition makes it especially important that the forthcoming report avoid assuming that market structure mechanistically determines firm conduct and performance.¹⁵

By far, the most prominent dynamic concept of competition is associated with economist Joseph Schumpeter. Schumpeter argued that “competition from the new commodity, the new technology, the new source of supply, the new type of organization—competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the output of existing firms, but at their foundations and their very lives” triggers the most significant advances in human well being.¹⁶ This contrasts markedly with the concept of competition underlying the rigid structuralist view—a state in which numerous firms producing identical services with the same technology charge identical prices, because no firm is large enough to influence price.¹⁷

More recently, a variety of other scholars have also developed dynamic theories of competition.¹⁸ In “evolutionary” competition theories, different firms have different abilities, novelty constantly arises, innovation occurs as firms learn, and there are limits to the amount of information decision makers can acquire and process. Competition is an open-ended process of innovation, experimentation, and feedback.¹⁹ The purpose of competition is to reveal what services, costs, and prices are possible. The firms that survive and grow are those that do a better job than others of anticipating what consumers

¹⁴ See Section 1.5, Concentration and Market Shares. A copy of the guidelines is available at http://www.usdoj.gov/atr/public/guidelines/horiz_book/toc.html.

¹⁵ “In stark contrast to the neoclassical assumption of the structure-conduct-performance paradigm, in dynamic contexts conduct in this framework is not a function of market structure. Market conduct is driven more by *internal* organizational factors: standard operating procedures, investment strategies, and improvement routines. Performance depends on the (relative) organizational capabilities and behavioral traits of the enterprise. Enhanced industrial performance also stems from improvement in individual technologies and expanded use of more productive technologies.” J. Gregory Sidak and David J. Teece, *Favoring Dynamic Competition Over Static Competition: A Neo-Schumpeterian Approach to Advancing Innovation Through Antitrust and Merger Law* 33 (2009), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1479874.

¹⁶ Joseph A. Schumpeter, *CAPITALISM, SOCIALISM AND DEMOCRACY* 84 (New York: Harper & Row, 1942).

¹⁷ Christopher M. Grengs, *Verizon v. Trinko: From Post-Chicago Antitrust to Resource-Advantage Competition*, 2 J. LAW, ECON., & POLICY 121-30 (2006); Sidak and Teece, *supra* note 15, at 23-27.

¹⁸ For an extensive summary of dynamic competition theories and references, see Jerry Ellig and Daniel Lin, *A Taxonomy of Dynamic Competition Theories*, in Jerry Ellig (Ed.), *DYNAMIC COMPETITION AND PUBLIC POLICY* 16-44 (New York: Cambridge University Press, 2001).

¹⁹ Richard R. Nelson, *The Tension Between Process Stories and Equilibrium Models: Analyzing the Productivity-Growth Slowdown of the 1970s*, in Richard N. Langlois, ed., *ECONOMICS AS A PROCESS: ESSAYS IN THE NEW INSTITUTIONAL ECONOMICS* (Cambridge: Cambridge University Press, 1986).

want and finding the best way to produce it.²⁰ Strategic management scholars explicitly view competition as a continual striving to cost-effectively develop superior capabilities to serve consumers.²¹ “Indicators of dynamic competition include heterogeneous firms engaging in experimentation and innovation. They develop and introduce new products and processes, and they rework and adjust internal processes. Firms constantly battle unanticipated events. Rivalrous behavior is the norm.”²²

Consideration of dynamic competition is especially relevant when assessing markets for mobile wireless services. The commission notes that “[t]he mobile wireless market undergoes frequent and rapid technological advances.”²³ In a companion notice, the commission seeks comment on ways to preserve and extend innovation in wireless.²⁴ The *Thirteenth Report* provides numerous examples of innovation in technology, pricing, and services.²⁵

The FCC’s Notice appears very concerned with changing competition analysis to take into account innovation and activity in “upstream” and “downstream” markets.²⁶ The four categories of structure, firm conduct, consumer behavior, and market performance should be flexible enough to accommodate analysis of these factors. Innovation, for example, is a form of firm conduct that affects and is affected by market structure, and of course innovation affects consumer behavior and market performance. The same could be said for vertical relationships. The basic four-part framework for analysis need not change.

In the following sections, we highlight specific opportunities to improve the analysis of competition in the annual mobile wireless reports.

III. Barriers to Entry

Barriers to entry could have a significant effect on competition in wireless. “If entry into a market is easy, then entry or the threat of entry may prevent incumbent operators from exercising market power, either collectively or unilaterally, even in highly concentrated markets.”²⁷ The Notice of Inquiry recognizes the importance of entry barriers:

²⁰ Friedrich Hayek, *Competition as a Discovery Procedure*, in Hayek, *NEW STUDIES IN PHILOSOPHY, POLITICS, AND ECONOMICS* 179-90 (Chicago: University of Chicago Press, 1978); Israel Kirzner, *The Perils of Regulation: A Market Process Approach*, in *DISCOVERY AND THE CAPITALIST PROCESS* 119-49 (Chicago: University of Chicago Press, 1985); Kirzner, *COMPETITION AND ENTREPRENEURSHIP* (Chicago: University of Chicago Press, 1973).

²¹ Jay Barney, *Competence Explanations of Economic Profits in Strategic Management: Some Policy Implications*, in Ellig, (Ed.), *DYNAMIC COMPETITION AND PUBLIC POLICY* 45-64 (2001); Shelby D. Hunt, *A GENERAL THEORY OF COMPETITION* (2000).

²² Sidak and Teece, *supra* note 17, at 30.

²³ *Wireless Competition Notice of Inquiry*, para. 31.

²⁴ Federal Communications Commission, *In the Matter of Fostering Innovation and Investment in the Wireless Communications Market, Notice of Inquiry*, GN Docket No. 09-157 (released August 27, 2009).

²⁵ See *Thirteenth Report*, Section IV.

²⁶ *Wireless Competition Notice of Inquiry*, para 5.

²⁷ *Thirteenth Report*, para. 63.

*. . . previous CMRS Competition Reports found that the wireless sector is characterized by large barriers to entry. We seek comment on the relationship between competition and domestic investment in the mobile wireless ecosystem. We also seek comment on any barriers to entry or growth that exist in the mobile wireless market.*²⁸

Based on a reading of the most recent wireless competition report, we see several opportunities to improve the analysis of barriers to entry

A. Non-regulatory barriers

1. Clear definition needed

The *Thirteenth Report* posits three non-regulatory barriers to entry: advertising expenditures, economies of scale, and inability of entrants to borrow sufficient sums to finance efficient start-ups.²⁹ This list is simultaneously too narrow and too broad.

It is too narrow because contemporary economic theory regards all sunk costs—costs that an entrant cannot recover if it later leaves the market—as barriers to entry.³⁰ The *Thirteenth Report* notes that advertising expenditures can be sunk costs, but advertising expenditures are only one form of sunk cost. If expenditures on towers and other capital cannot be fully recovered if the entrant leaves the market, then the unrecoverable portion of the expenditures is a sunk cost.

The list is also too broad, because the items on the list need not always be barriers to entry. If advertising expenditures build the value of an entrant's brand name that can then be sold along with physical assets, some or all of the advertising expenditure is not sunk. If, as evidence elsewhere in the report indicates,³¹ incumbents must continue to advertise, then advertising is an ongoing expense for incumbents as well as entrants, rather than a sunk cost faced only by entrants. Economies of scale, by themselves, are not a barrier to entry.³² If economies of scale are large, the entrant can compete to displace an incumbent, rather than just taking some customers away from the incumbent.³³ Similarly, the need to borrow large sums is not a barrier to entry per se, because if none of the entrant's investments are sunk, then investments are not very risky (since the assets could

²⁸ *Wireless Competition Notice of Inquiry*, para. 28.

²⁹ *Thirteenth Report*, paras. 100-01.

³⁰ "Sunk costs . . . are costs that (in some short or intermediate run) cannot be eliminated, even by total cessation of production. As such, once committed, sunk costs are no longer a portion of the opportunity cost of production." William J. Baumol, John C. Panzar, and Robert D. Willig, *CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE* 280 (1982).

³¹ *Thirteenth Report*, Sec. IV.B.4.

³² "In particular, we argue now that fixed costs need not have any detrimental welfare consequences, unless they also happen to be sunk." Baumol et. al., *supra* note 30, at 292.

³³ *Id.* at 292, 303. See also Harold Demsetz, *Why Regulate Utilities?*, 11 J. LAW & ECON. 55 (1968).

be resold later), and a capable entrant therefore should have little disadvantage obtaining capital.³⁴

Fundamentally, the report needs to articulate a clear definition of what constitutes a non-regulatory barrier to entry, rather than just listing some classes of barriers. “Sunk cost” is one highly defensible definition, because most barriers to entry that reduce economic welfare can ultimately be traced back to sunk costs.³⁵ “The potential to afford incumbent carriers first mover advantages over latecomers”³⁶ is less defensible, because an incumbent may have an advantage simply because it has better technology or is better at satisfying consumers. This broad definition would imply that an incumbent’s genuine efficiency that benefits consumers is a barrier to entry.³⁷

After stating a definition, the report should explain why particular phenomena might fit the definition. The *Thirteenth Report’s* discussion of advertising is a good example, because it explains that advertising expenditures may be sunk costs.³⁸ Finally, the report should present factual evidence showing whether the potential barriers to entry really do fit the definition. The discussion of advertising, for example, should include a discussion of research documenting how much of wireless carriers’ advertising expenditures really are sunk. Some of the expenditure may build the value of a brand name with residual value that could be recovered if the entrant leaves the market, and incumbents as well as entrants clearly continue spend heavily on advertising. Thus, the total amount of advertising expenditures likely overstates the amount of sunk cost.

2. Dynamic considerations

The economic theory that identifies sunk costs as entry barriers assumes that incumbents and potential entrants all have access to the same technology so that all can produce the same products or services at the same total cost.³⁹ In dynamically competitive markets with heterogeneous firms, innovation allows new entrants to overcome some of the incumbent’s sunk cost advantage. If a new entrant can provide service comparable to the incumbent’s at a lower total cost, offer new performance features that are valuable to consumers, or find a more effective way to market its services, then entry can occur even in the presence of sunk costs.

Given the prevalence of technological and marketing innovation in wireless communications, it is not sufficient that future commission reports assess the extent of sunk costs to identify barriers to entry. The report should also assess, based on historical experience and recent developments, whether innovation has or could mitigate the incumbents’ sunk cost advantage.

³⁴ “The need to sink money into a new enterprise, whether into physical capital, advertising, or anything else, imposes a difference between the incremental cost and the *incremental risk* that are faced by an entrant and an incumbent.” Baumol et. al., *supra* note 30, at 290.

³⁵ *Id.* at 282.

³⁶ *Thirteenth Report*, para. 101.

³⁷ Viscusi et. al, *supra* note 13, at 168.

³⁸ *Thirteenth Report*, para. 100.

³⁹ Viscusi et. al., *supra* note 13, at 172.

During the past several years, entry into commercial mobile wireless has actually occurred despite potentially significant sunk costs. Clearwire operates a national broadband data network in 47 cities using Wi-Max technology. Cox Cable purchased spectrum licenses and plans to deploy its own 3G wireless data network. T-Mobile effectively entered the nationwide wireless data market when it acquired \$4.2 billion worth of licenses in the 2006 Advanced Wireless Services 2006 auction. “The proposition that entry is economically feasible is demonstrated by the fact that it is actually occurring.”⁴⁰

B. Spectrum as a barrier to entry

The Notice of Inquiry includes a cluster of questions that ask how spectrum holdings affect the mobile wireless market and whether access to spectrum is a barrier to entry:

With respect to spectrum utilization, how should we assess the ways in which spectrum holdings affect market structure, conduct, and performance? . . . How much additional spectrum will be required to support next generation technologies and mobile broadband applications?⁴¹ . . . The Fourteenth Report Public Notice also asked whether existing service providers are spectrum constrained, and whether potential entrants have sufficient opportunities to access spectrum . . . ⁴² Can a potential entrant in the nationwide market for the provision of mobile wireless services buy or lease spectrum licenses on a nationwide basis (e.g., to achieve efficient economies of scale in network coverage)?⁴³

The *Thirteenth Report* first suggests that access to spectrum could be a barrier to entry. Next, it offers some evidence that the commission’s spectrum auctions, flexible use policies, and secondary markets help mitigate the barrier to entry. Finally, it concludes that spectrum is not a barrier to entry at all because of these policies.⁴⁴

The *Thirteenth Report*’s spectrum discussion focuses largely on whether the FCC’s auction rules disadvantage potential competitors.⁴⁵ This focus ignores a much larger and more fundamental economic issue. By artificially limiting the amount of spectrum available for commercial wireless services, federal policy limits the amount of service that can be offered.⁴⁶ This quantitative limit on the amount of service increases prices and

⁴⁰ Everett M. Ehrlich, Jeffrey A. Eisenach, and Wayne A. Leighton, Criterion Economics, *The Impact of Regulation on Innovation and Choice in Wireless Communications* 10 (Sept. 2009), available at <http://ssrn.com/abstract=1478528>.

⁴¹ *Wireless Competition Notice of Inquiry*, para. 24.

⁴² *Id.*, para. 28.

⁴³ *Id.*, para. 30.

⁴⁴ *Thirteenth Report*, paras. 65-68.

⁴⁵ See, e.g., *Thirteenth Report*, paras. 68-99.

⁴⁶ Carriers can, of course, affect the amount by deploying technologies that make more intensive use of the spectrum. But for any given level of technology, carriers could provide more or better service with more spectrum.

diminishes consumer welfare, regardless of how it affects the number of competitors or competitive conduct in the mobile wireless industry. The price increases and consumer welfare losses would occur regardless of whether the FCC awarded licenses through auctions, hearings, or lotteries.⁴⁷ The restriction on output occurs because the government has restricted the amount of an essential input. In this way, federal spectrum policy operates much like that paradigmatic textbook example of a government-imposed entry barrier: taxi medallions.⁴⁸

As with taxi medallions, one can estimate the severity of the output restriction by measuring how much firms are willing to pay to get more spectrum. FCC spectrum auctions collect from the carriers a portion of the profits they expect to earn from the spectrum license.⁴⁹ The results of spectrum auctions, therefore, indicate whether carriers expect to earn “economic” profits from the new licenses. Spectrum auctions thus provide an ideal mechanism for determining whether spectrum is a barrier to entry or expansion of service.

FCC spectrum auctions indicate that firms are usually willing to pay very large amounts for useful spectrum the federal government makes available. The 700 MHz auction in 2008, for example, raised \$19 billion.⁵⁰ Clearly, mobile wireless firms are still willing to pay large sums of money for the privilege of entering markets or expanding service. This suggests that availability of spectrum is still a significant barrier to entry or to expansion of service.

Of course, spectrum has a key difference from taxi medallions: It is a valuable resource with alternative uses both inside and outside of government. Therefore, the amounts carriers pay for spectrum do not reflect economic profits exclusively, but are partially payments for the “opportunity cost” of moving the spectrum from its next-best alternative use other than commercial mobile wireless services. Actually knowing the value of spectrum in alternative uses is currently problematic, since large users like government agencies and broadcasters are not required to acquire their spectrum in auctions. This is an argument for making much more spectrum available for a wide variety of uses and requiring both public and private users to bid for it.

Although the opportunity cost is hard to know under current circumstances, as long as commercial wireless companies are willing to pay more than the spectrum is worth to the government or to users outside the wireless industry, then federal spectrum policy has created a restriction on output that harms consumers.

⁴⁷ Jerry Ellig, *Costs and Consequences of Federal Telecommunications Regulations*, 58 FED. COMM. LAW J. 78-82 (2006), and the references cited therein.

⁴⁸ Textbook presentations clearly indicate that taxi medallions increase prices by reducing the number of taxicabs – regardless of whether they increase concentration or make collusion more likely. See Viscusi et. al., *supra* note 13, at 584; Alfred E. Kahn, *The Economics of Regulation*, Vol. II (1971) at 111.

⁴⁹ Evan Kwerel, “Spectrum Auctions Do Not Raise the Price of Wireless Services: Theory and Evidence,” manuscript, FCC Office of Plans and Policy (2000).

⁵⁰ *Thirteenth Report*, Executive Summary, at 9.

We recognize, of course, that making more spectrum available for flexible, commercial use often requires the cooperation of other federal agencies (such as the National Telecommunications and Information Administration and agencies that currently use spectrum) and congressional action. In such cases, the commission is ideally situated to take the lead in aggressively advocating the reallocation of spectrum for flexible commercial use. The commission can point to an impressive track record of price reductions, innovations, and other improvements in consumer welfare that followed many previous spectrum auctions—a record few regulatory policies can match.

IV. Switching Costs

Customer “switching costs” could inhibit competition by making it more difficult for customers to change providers in response to one provider’s price increase or reduction in its quality of service. The Notice expresses concern about switching costs that might inhibit competition:

Are there switching or search costs that affect a consumer’s ability to change plans or providers (e.g., ETFs, address book portability, service quality)?⁵¹

One approach to switching costs is to attempt to measure them directly and then assess whether they make a big difference in consumer decisions. Another option is to examine consumer behavior to see if consumers do, in fact, switch providers. If substantial switching occurs, then we can conclude that switching costs are not large enough to inhibit competition. If substantial switching does not occur, then one must assess whether this occurs because of high switching costs or simply because carriers are generally good at keeping their customers satisfied.

The *Thirteenth Report* offers a nugget of data that suggests switching costs are not high relative to the benefits of switching. It notes that providers report monthly customer “churn” rates ranging from 1.5 percent to 3 percent.⁵² These figures imply that individual carriers lose between 18 and 36 percent of their customers each year! This high degree of customer mobility occurs despite the fact that many customers sign two-year service contracts, which further shrinks the number of consumers who might be expected to switch in any given year.

Given that substantial customer switching does occur, we doubt it would be productive for the commission to spend much time trying to measure switching costs.

V. Market Performance

By most conventional economic indicators, the performance of the mobile wireless market has been an amazing success story. The commission’s most recent report reveals

⁵¹ *Wireless Competition Notice of Inquiry*, para 13.

⁵² *Thirteenth Report*, para. 180.

that mobile wireless prices have dropped steadily and substantially, the number of subscribers quantity, and quality of service have risen dramatically, and carriers continue to introduce new, innovative services.

Nevertheless, the commission now proposes to examine carriers' profitability as an additional measure of market performance:

*Building on our questions in the Fourteenth Report Public Notice on profitability, what data should we use to measure investment (e.g., return on investment, return on invested capital, operating margins)?*⁵³

The *Fourteenth Report Public Notice* declared, "We seek to determine whether wireless telecommunications providers are earning 'abnormal profits,' defined as revenue minus all costs, including all opportunity costs." The notice provided a list of eight possible profitability measures, seven of which are based on accounting data. It then stated, "The Bureau seeks comment on which of these methods is the most appropriate for analyzing the profitability of wireless telecommunications firms and providing insight into whether there is effective competition."⁵⁴

The notice's definition of "abnormal" profits corresponds to the economist's term "economic" profits. In a market with falling prices, expanding quantity of service, and continuous innovation, measurement of economic profits is an unnecessary morass the commission should avoid, for three reasons:

- Accounting data do not accurately measure economic profits.
- Economic profits can be caused either by market power or by efficiency and innovation.
- Regulation of profits is unlikely to produce price reductions nearly as large as those the wireless market has actually produced.

A. Accounting data do not accurately measure economic profits.

There are numerous well-known problems with using accounting data to measure economic profits. The most basic reason is that accounting and economic profits are two different things. Accounting profit is the stream of actual revenues for a given time period minus costs, where costs include depreciation of assets acquired in the past. The accounting rate of return is net revenue for the year divided by some measure of the value of the firm's assets, equity, or investments. Economic profit is revenue that exceeds opportunity cost, including the risk-adjusted opportunity cost of capital. The economic rate of return is the discount rate that makes the stream of future revenues from an investment equal to the initial capital cost (where the initial capital cost includes a "competitive" rate of return on capital). There are many reasons these will differ, including differences in depreciation schedules, treatment of some capital expenditures like advertising and research and development as current expenses, and the timing of the

⁵³ *Wireless Competition Notice of Inquiry*, para. 28.

⁵⁴ FCC Public Notice, *supra* note 3, at 12.

receipt of revenues. More than 25 years ago, economists Franklin Fisher and John McGowan explained these differences in detail, concluding,

Economists (and others) who believe that analysis of accounting rates of return will tell them much (if they can only overcome the various definitional problems which separate economists and accountants) are deluding themselves. The literature which supposedly relates concentration and economic profit rates does no such thing, and examination of absolute or relative accounting rates of return to draw conclusions about monopoly profits is a totally misleading enterprise.⁵⁵

B. Economic profits can be caused either by market power or by efficiency and innovation.

Even if accounting data could accurately measure economic profits, the presence of substantial innovation and dynamic competition in mobile wireless makes economic profits an ambiguous measure of market performance. In dynamic competition, the firm that first introduces a cost-reducing or quality-enhancing technology, feature, or service can temporarily earn higher profits, until its success is imitated.⁵⁶ Successful competitors appear to earn abnormal profits.⁵⁷ The prospect of earning these rents, however, is the prize that motivates firms to strive for superior performance. Profits that appear to be “abnormal” after the competitive process has revealed which competitors are successful may actually be a risk premium or a return to the firm’s investment in unique capabilities. A competitor that engages in a stream of successful innovative activities may appear to earn super-normal profits over a sustained period of time, but these seemingly “excessive” profits are simply the returns to a series of successful innovations.⁵⁸ If a market is structurally competitive and firms are engaging in competitive behavior, any economic profits likely represent returns to successful innovation that benefits consumers.

C. Regulation of profits is unlikely to produce price reductions nearly as large as those the wireless market has actually produced.

Presumably, if accounting measures indicated the presence of economic profits, then the commission could consider some type of regulatory response to induce wireless firms to share those profits with consumers. Such a response could involve direct regulation of profits or prices. Or, the commission could simply use “abnormal” profits as justification for more targeted interventions that would cease only if profit levels receded. To the extent that any regulatory decision is tied to the level of profits or prices, it could have some of the same effects as direct regulation of profits or prices.

⁵⁵ Franklin M. Fisher and John J. McGowan, *On the Misuse of Accounting Rates of Return to Infer Monopoly Profits*, 73 AM. ECON. REV. 82 (1983) at 91.

⁵⁶ Franklin M. Fisher, John J. McGowan, and Joen E. Greenwood, *FOLDED, SPINDLED, AND MUTILATED: ECONOMIC ANALYSIS AND U.S. VS. IBM* (1983) at 220-23.

⁵⁷ Harold Demsetz, *Industry Structure, Market Rivalry, and Public Policy*, 16 J. LAW & ECON. 1 (1973).

⁵⁸ Fisher et. al., *supra* note 56, at 33-37.

Price data in the commission's own reports, however, cast doubt on the idea that regulation could improve the wireless industry's performance. The accompanying table reproduces some of the average wireless revenue per minute data from table 12 of the *Thirteenth Report*. It also adjusts these figures for inflation using the consumer price index. Clearly, the wireless market has produced enormous price reductions. Adjusted for inflation, average revenue per minute fell by 87 percent between 1997 and 2007, and average voice revenue per minute fell by 90 percent. Just during the last five years, inflation-adjusted average revenue per minute fell by 53 percent, and average voice revenue per minute fell by 61 percent.

		Average Revenue per Minute	Real Average Revenue per Minute	% Change	Average Revenue per Voice Minute	Real Avg. Revenue per Voice Minute	% Change
1997	100	\$0.37	\$0.48		\$0.37	\$0.48	
1998	101.6	\$0.29	\$0.37	-23	\$0.29	\$0.37	-23
1999	103.8	\$0.22	\$0.27	-26	\$0.22	\$0.27	-26
2000	107.3	\$0.18	\$0.22	-21	\$0.18	\$0.22	-21
2001	110.3	\$0.12	\$0.14	-35	\$0.12	\$0.14	-35
2002	112.1	\$0.11	\$0.13	-10	\$0.11	\$0.13	-10
2003	114.6	\$0.10	\$0.11	-11	\$0.10	\$0.11	-11
2004	117.7	\$0.09	\$0.10	-12	\$0.08	\$0.09	-22
2005	121.7	\$0.07	\$0.07	-25	\$0.06	\$0.06	-27
2006	125.6	\$0.07	\$0.07	-3	\$0.06	\$0.06	-3
2007	129.2	\$0.06	\$0.06	-17	\$0.05	\$0.05	-19
Real percentage price change 1997-2007				-87			-90
Real percentage price change 2002-2007				-53			-61

Source: Authors' calculations based on CPI and revenue per minute data in FCC, *Thirteenth Report*, tables 11 and 12.

It strains credulity to suggest that some type of regulation aimed at eliminating economic profits could deliver better results for consumers than the wireless marketplace has actually delivered without such regulation. Ample empirical evidence demonstrates that direct regulation of profits—rate-of-return regulation—tends to inflate costs and reduce innovation.⁵⁹ The resulting prices may seem “reasonable” given the level of costs, but they can be higher than unregulated prices because costs are higher.

Recognizing this problem, many regulators, including the FCC, have attempted to improve incentives for innovation and cost reduction by substituting “incentive” regulation for rate-of-return regulation for wireline services. Incentive regulation induces the regulated firm to share the fruits of innovation and cost reduction with consumers by allowing prices to increase by the rate of inflation minus some percentage productivity offset. Telecommunications regulators have required productivity offsets ranging between 0 and 7 percent annually.⁶⁰ If wireless had been subject to incentive regulation, even a 7 percent productivity offset would have reduced wireless revenue per minute by

⁵⁹ Leon Courville, *Regulation and Efficiency in the Electric Utility Industry*, 5 BELL JOURNAL OF ECONOMICS 53 (Spring); Paul M. Hayashi and John M. Trapani, *Rate of Return Regulation and the Regulated Firm's Choice of Capital-Labor Ratio: Further Empirical Evidence on the Averch-Johnson Effect*, 42 SOUTHERN ECONOMIC JOURNAL 384 (1976); H. Craig Petersen, *An Empirical Test of Regulatory Effects*, 6 BELL JOURNAL OF ECONOMICS 111 (1975); Robert M. Spann, *Rate of Return Regulation and Efficiency in Production: An Empirical Test of the Averch-Johnson Thesis*, 5 BELL JOURNAL OF ECONOMICS 8 (Spring); E. Ray Canterbury, Ben Johnson, and Don Reading, *Cost Savings from Nuclear Regulatory Reform: An Econometric Model*, 62 SOUTHERN ECONOMIC JOURNAL 554 (1996).

⁶⁰ Lilia Perez-Chazolla, National Regulatory Research Institute, STATE RETAIL RATE REGULATION OF LOCAL EXCHANGE PROVIDERS AS OF DECEMBER 2006 (April 2007), Table 3. The unusually high 7 percent figure applies to one North Dakota carrier's interconnection rates.

only 36 percent since 1997 and by 19 percent since 2002.⁶¹ In other words, the lightly regulated wireless market produced price reductions 2.5 times as large as those that could have been expected under severe, highly efficient, perfectly operating regulation.

For all of these reasons, we doubt that attempting to measure wireless carriers' profitability serves any constructive purpose.

VI. Vertical Relationships

The Notice contains several questions reflecting the commission's concern that the structure of the wireless market may affect competition in downstream markets, and vice versa:

*How does the structure of the wireless market affect the market for "downstream" application services?*⁶² (Followed by a variety of questions asking about applications available to consumers and whether consumers can download applications of their choice.)

*In this NOI, we seek information on how vertical relationships impact competition in the broader mobile wireless ecosystem. What are the key vertical relationships among market segments? Are these relationships conducive to an overall competitive market?*⁶³

We focus on one particularly important set of vertical relationships: closed, proprietary devices and platforms. Some are concerned that the closed proprietary nature of many devices and platforms is a sign of market power, or a hindrance to competition. However, as long as competition among platforms exists, there is little to fear. Closed and open platforms will innovate in different ways and will make offerings that appeal to different parts of the market.

Competition might not guarantee that all platforms are open. A closed platform can survive if it offers some advantage—such as lower costs or higher quality—to a sufficiently large segment of consumers. But competition will ensure that an open platform is available as long as a sufficient number of consumers want and are willing to pay for it.

Different platforms exhibit different degrees of openness. Two of the major national networks—AT&T and T-Mobile—operate on the GSM standard. As a result, these carriers allow any device that conforms to the GSM standard to operate on their

⁶¹ Figures were calculated by starting with a base year (1997 or 2002) and altering rates in subsequent years by a percentage equal to the consumer price index minus seven percentage points, to simulate incentive regulation of prices with a very aggressive productivity offset. The percentage reductions are the same for wireless revenues per minute and wireless voice revenues per minute because the base for both figures is the same in 1997 and in 2003.

⁶² *Wireless Competition Notice of Inquiry*, para. 19.

⁶³ *Id.*, para. 27.

networks. The carriers, of course, will not subsidize or provide technical support for all devices, but consumers nevertheless have the option to purchase unlocked devices and attach them to at least two competing networks.

There is also an abundance of mobile device platforms from which consumers can choose. Some are closed platforms that allow users to run only applications approved by the carrier or device manufacturer. These include Apple's iPhone, Microsoft's Danger, and many embedded operating systems. Other platforms are open and allow users to run any third party application. These include Microsoft's Windows Mobile, RIM's BlackBerry, Palm's WebOS, Google's Android, and Nokia's Symbian. It should also be noted that the Android and Symbian platforms themselves are open-source initiatives. This means that users can not only run their choice of third party apps, but they can also modify and run different versions of the operating system.⁶⁴

Finally, while carriers often cripple their subsidized devices so that they may only run carrier-approved applications—and becoming a carrier-approved developer has historically been too expensive and onerous a feat for small entrepreneurs⁶⁵—the tide has begun to turn. Apple's introduction of the iPhone was a game-changer because it put application approval and distribution in the hands of the device maker, who has a special incentive to enhance the value of its platform. The company released a simple software development kit at no charge and encouraged thousands of developers to create applications for the iPhone. Perhaps more importantly, Apple created the App Store, a unified catalog of applications, and made it easy for consumers to find, purchase, and install applications on their devices. In just over a year since its launch, the App Store has amassed over 75,000 applications.⁶⁶

Given the success of the App Store's development and distribution strategy, competitors have begun to follow Apple's lead. In the last year, Microsoft, Google, RIM, and Palm have all announced or launched their own app store initiatives. What's key to note about this is that while consumers could always download and install third-party applications on open platforms such as Windows Mobile, BlackBerry, and Symbian, the process was difficult for consumers. The unified app store innovation has created an explosion in mobile application development and consumer use.

As carriers have done historically, Apple controls which applications are allowed to run on its proprietary iPhone platform. Apple has, however, made it very easy for developers to create and submit applications to the App Store, and the astounding number of applications available for the platform underscores that fact. This has been a boon for both developers and consumers. Apple, however, does reject applications that are not up to its standards of quality or which they otherwise feel would detract from the user

⁶⁴ Gina Trapani, *Why (and How) to Root Your Android Phone*, SMARTERWARE, Sep. 15, 2009, at <http://smarterware.org/3189/why-and-how-to-root-your-android-phone>.

⁶⁵ See Tim Wu, *Wireless Net Neutrality: Cellular Carterfone and Consumer Choice in Mobile Broadband*, New America Foundation Wireless Future Program Working Paper No. 17 (Feb. 2007), available at http://www.newamerica.net/publications/policy/wireless_net_neutrality.

⁶⁶ Apple, Inc., Press Release, *Apple Introduces New iPod touch Lineup*, Sep. 9, 2009, available at <http://www.apple.com/pr/library/2009/09/09touch.html>.

experience.⁶⁷ What must be understood is that it is precisely this ability to jealously guard its platform and to present to consumers only applications that conform to Apple's vision of a quality user experience, that motivates Apple to make the investment it has in developing the iPhone. And it probably also accounts in large part for its success.

Proprietary control over a platform does not pose a threat to competition or innovation. The good news is that for those consumers and developers who prefer to be free of any restrictions and like to tinker, there are several other platforms available to them. Google's Android is a good example. Not only can any application be freely installed on the platform, but the operating system itself can be modified. Other platforms such as Palm WebOS include an app store to which entry is regulated, but users are also free to download and install "homebrew" apps not available in the official catalog. Finally, as long as a device has a standards-compliant web browser, such as the iPhone's WebKit-based Safari, users can still access a wide variety of applications.

Innovation is best served when there is a creative diversity of entrepreneurial approaches to platforms. As long as consumers can choose among different platforms, there is no reason why the regulator should prefer an open platform to a proprietary one. Each has its comparative advantages and satisfies different segments of the market.

Even if the commission concludes that impediments to competition make some closed platforms problematic, that does not mean mandated openness will benefit consumers on net. Carriers employ closed platforms to reduce risk, reduce transaction costs, offer differentiated services to diverse consumers, and ensure service quality. These practices confer real benefits on consumers in the form of lower prices, better services, and greater innovation.⁶⁸ To promote consumer welfare, any decision to regulate must first weigh the consumer benefits of a particular practice against the consumer costs.

V. Conclusions

The commission's traditional four-part framework for examining wireless competition is comprehensive and flexible enough to provide a thorough analysis of the wireless industry's performance and its effects on consumer welfare. Its comprehensiveness and flexibility will remain as long as the commission continues to use the categories of market structure, firm conduct, consumer behavior, and market performance as a list of factors to be examined rather than a rigid causal theory. As contemporary industrial

⁶⁷ One of the authors developed an iPhone application that was recently rejected from App Store inclusion because an icon it used violated Apple's Human Interface Guidelines. As a developer, he was a little frustrated that he now has to find a new icon, resubmit the app, and likely wait two more weeks for such a small thing. As an iPhone user, though, he's glad Apple is manning the quality control station. It is precisely Apple's seeming capriciousness that has made the iPhone such a success. Consumers know that the iPhone and its apps "just work." No other platform has ever "just worked" as well, and third-party apps for open platforms like Windows Mobile tend to be typified by poor user interfaces. *See* Jerry Brito, *Apple rejected my iPhone App, and I'm glad*, Surprisingly Free, Sep. 28, 2009, available at <http://surprisinglyfree.com/2009/09/28/apple-rejected-my-iphone-app-and-im-glad>.

⁶⁸ Ehrlich et. al, *supra* note 40, at 36-45.

organization economists, federal antitrust agencies, and the commission itself have noted, market structure does not automatically determine firm conduct or performance.

In addition to these observations on the commission's general framework for competitive analysis, we offer the following recommendations in response to specific commission questions:

- **Non-regulatory entry barriers:** The commission's annual reports on mobile wireless competition should include a rigorous definition of non-regulatory barriers to entry, a coherent theory explaining why enumerated potential barriers might satisfy that definition, and empirical analysis that shows whether the potential non-regulatory barriers are in fact barriers. The most recent report, for example, helpfully identifies advertising expenditures as a potential "sunk cost" that inhibits entry, but fails to explain whether the commission believes sunk costs are the *only* non-regulatory barriers to entry and provides no evidence assessing *how much* of the advertising expenditures are a sunk cost.
- **Spectrum as an entry barrier:** Analysis of spectrum as an entry barrier should recognize that limits on the amount of spectrum available for commercial use effectively limit the quantity and quality of service that existing or new carriers can offer. The fact that carriers willingly pay billions of dollars for spectrum indicates that federal spectrum policy limits entry and/or expansion of service. By limiting the quantity and quality of service, federal spectrum policy diminishes consumer welfare.
- **Switching costs:** Switching costs can inhibit competition, and the Notice of Inquiry asks for data about the size of switching costs. One can also examine consumer behavior to determine whether switching costs may be high or low. Substantial consumer "churn," totaling 18–36 percent per year, suggests that switching costs are relatively small compared to the benefits consumers perceive from switching. Therefore, it is unlikely that switching costs inhibit competition.
- **Profitability calculations:** Calculating wireless companies' profits based on accounting data would likely produce little additional insight about market performance and may produce highly misleading results. Past wireless competition reports demonstrate that the wireless market is structurally competitive, firms engage in rivalrous competition, prices have plummeted, and quantity and variety of services have expanded. We estimate that even a very stringent, efficient, and perfectly functioning regulatory system would have produced less than half of the price reductions that the competitive wireless market produced during the past decade.
- **Vertical relationships:** The commission asks how upstream and downstream relationships affect competition in wireless, and vice versa. A special concern in both this Notice of Inquiry and the accompanying one on wireless innovation is the existence of closed, proprietary platforms, and devices. A closed platform or

device causes competitive concerns only if consumers lack access to competing platforms or devices. Given the intense competition between platforms with varying degrees of openness, we see little reason regulators should favor open over closed platforms.

Few regulatory initiatives have created anywhere near the benefits for consumers that the FCC has created by auctioning flexible-use spectrum for commercial wireless services. The commission's most-recent commercial mobile wireless competition report demonstrates that the market for wireless services is structurally competitive; firms engage in vigorous, rivalrous competition; customer switching is substantial; and prices, quantity, and variety of services have expanded tremendously.